

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1 **Claim 1 (currently amended):** A method of making a
2 hollow, reinforced pressure vessel, comprising the
3 steps of:
4 cutting thermoplastic fibers to form a plurality of
5 discrete thermoplastic fibers;
6 forming a hollow preform comprised of a cylindrical
7 sidewall portion, a domed bottom portion, and a domed top
8 portion, wherein at least one of said portions is
9 comprised substantially of a plurality of discrete
10 reinforcing fibers separate from, and intimately
11 intermixed with, said plurality of discrete thermoplastic
12 fibers, wherein said intermixed fibers ~~substantially~~
13 maintain a shape of said at least one of said portions;
14 said preform shape;
15 providing a rigid mold having a cylindrical sidewall
16 portion and domed end portions corresponding to said
17 preform portions;
18 positioning said preform against the inner surface
19 of said corresponding mold portions;

20 compressing said preform with an internally
21 pressurized, inflatable core that had been previously
22 inserted within said preform having a cylindrical
23 sidewall portion, and top and bottom dome portions to
24 hold said preform in place;

25 heating said preform to a temperature sufficient to
26 melt said thermoplastic fibers while the pressure in said
27 inflatable core compresses said preform and distributes
28 thermoplastic material from said thermoplastic fibers
29 throughout said preform to provide a fiber reinforced
30 molded article;

31 cooling said molded article until said thermoplastic
32 material is substantially solid;

33 reducing the pressure in said inflatable core; and
34 removing said molded article from said mold.

1 **Claim 2 (previously presented):** The method of claim
2 wherein the pressure in said inflatable core is
3 increased during the heating step to compress said
4 preform and maintain the distribution of thermoplastic
5 material throughout said preform, whereby voids in the
6 fiber reinforced molded article may be further reduced.

1 **Claim 3 (original):** The method of claim 1 wherein
2 said hollow preform comprises a separately preformed
3 sidewall portion and integrated bottom portion and a
4 separately preformed top dome portion.

1 **Claim 4 (original):** The method of claim 1 wherein
2 said hollow perform comprises a separately preformed
3 cylindrical sidewall portion and comprises separately
4 preformed domed portions.

1 **Claim 5 (previously presented):** The method of
2 claim 4 wherein the separately preformed domed portions
3 are comprised of filament wound isotensoid portions.

1 **Claim 6 (original):** The method of claim 5 wherein
2 the sidewall portions overlap the domed portions.

1 **Claim 7 (previously presented):** The method of
2 claim 4 wherein said cylindrical sidewall portion is
3 formed from a rectangular blanket of reinforcing fibers
4 intimately intermixed with thermoplastic material, said
5 blanket being positioned against said cylindrical
6 sidewall portion of the mold with a slight overlap of
7 opposite ends of said blanket.

1 **Claim 8 (original):** The method of claim 1 wherein
2 the ratio of reinforcing fiber to thermoplastic material
3 is substantially constant throughout said preform.

1 **Claim 9 (original):** The method of claim 8 wherein
2 said ratio is approximately 3:2.

1 **Claim 10 (previously presented):** The method of
2 claim 1 wherein the ratio of reinforcing fiber to
3 thermoplastic material varies within said preform.

1 **Claim 11 (original):** The method of claim 1
2 wherein the wall thickness of said preform is
3 substantially constant.

1 **Claim 12 (original):** The method of claim 1
2 wherein the wall thickness of said preform varies along
3 its length.

1 **Claim 13 (original):** The method of claim 1 wherein
2 said reinforcing fibers are glass fibers.

1 **Claim 14 (original):** The method of claim 13 wherein
2 said glass fibers are approximately 1 inch in length.

1 **Claim 15 (original):** The method of claim 1 wherein
2 said thermoplastic material is chosen from the group
3 comprised of: polypropylene, polyethylene, polybutylene
4 terephthalate, polyethylene terephthalate, and nylon.

1 **Claim 16 (original):** The method of claim 1 further
2 comprising, prior to said compressing, the step of
3 treating the outer surface of said inflatable core with
4 an adhesive agent so that said core is bonded to the
5 interior of said molded article.

1 **Claim 17 (original):** The method of claim 1 further
2 comprising, prior to said compressing, the steps of:
3 treating a surface of one of the top and bottom dome
4 portions and an adjacent sidewall portion of said
5 inflatable core with an adhesive agent to provide an
6 adhesive coated portion; and
7 treating a surface of another of said top and bottom
8 dome portions and an adjacent sidewall portion with a
9 releasing agent to provide a release coated portion; and,
10 after said removing, the step of:

11 disengaging the release coated portion of said
12 inflatable core from an inner surface of said molded
13 article while the adhesive coated portion remains adhered
14 to an inner surface of said molded article.

1 **Claim 18 (original):** The method of claim 1 further
2 comprising, prior to said compressing, the step of
3 treating the outer surface of said inflatable core with a
4 releasing agent; and, after removing said molded article
5 from the mold, the step of removing said inflatable core
6 from said molded article.

1 **Claim 19 (original):** The method of claim 1
2 wherein said temperature is approximately 400 °F and
3 maintaining said temperature for a period of at least
4 approximately 30 minutes.

1 **Claim 20 (original):** The method of claim 2 wherein
2 said pressure is increased to approximately 2530 psi.

Claims 21-23 (canceled)

1 **Claim 24 (original):** The method of claim 1 wherein
2 said inflatable core is a neoprene bladder.

1 **Claim 25 (original):** The method of claim 1 further
2 comprising the step of connecting said mold to a source
3 of vacuum during the heating step to further reduce the
4 incidence of voids in the finished article.

1 **Claim 26 (original):** The method of claim 2 further
2 comprising the step of connecting said mold to a source
3 of vacuum during the heating step to further reduce the
4 incidence of voids in the finished article.

1 **Claim 27 (currently amended):** A method of making a
2 hollow, reinforced pressure vessel, comprising the
3 steps of:
4 forming and assembling a hollow preform comprised of
5 a cylindrical sidewall portion, a domed bottom portion,
6 and a domed top portion, said forming and assembling
7 including the steps of:

8 providing a plurality of discrete reinforcing
9 fibers;
10 providing a plurality of discrete cut thermoplastic
11 fibers; and
12 forming at least one of said cylindrical sidewall
13 portion, domed bottom portion, and domed top portion by

14 collecting said plurality of discrete reinforcing fibers
15 and said plurality of discrete thermoplastic fibers onto
16 a vacuum screen to form said one or more portions,
17 wherein said plurality of fibers substantially maintain a
18 shape of said at least one portion;
19 providing assembling a hollow liner along with said
20 portions to into an assembled within said preform, said
21 liner having a cylindrical sidewall portion, a domed
22 bottom portion, and a domed top portion;
23 providing a rigid mold having a cylindrical sidewall
24 portion and domed end portions corresponding to said
25 preform portions;
26 positioning said assembled preform against the inner
27 surface of said corresponding mold portions;
28 heating said assembled preform sufficient to melt
29 said thermoplastic fibers and distribute thermoplastic
30 material from the thermoplastic fibers throughout said
31 assembled preform to provide a fiber reinforced
32 molded article;
33 cooling said molded article until said thermoplastic
34 material is substantially solid; and
35 removing said molded article from said mold.

1 **Claim 28 (previously presented):** The method of
2 claim 27 wherein said liner is a thermoplastic liner.

1 **Claim 29 (previously presented):** The method of
2 claim 27 further comprising, during said heating, the
3 step of pressurizing the liner with a gas or a fluid; and
4 prior to removing said molded article from the mold, the
5 step of reducing the pressure in said plastic liner.

1 **Claim 30 (original):** The method of claim 29 further
2 comprising, during said heating, the step of connecting
3 said mold to a source of vacuum during the pressurizing
4 step to further reduce the incidence of voids in the
5 finished article.

1 **Claim 31 (currently amended):** A method of making a
2 hollow, reinforced pressure vessel, comprising the
3 steps of:
4 a) providing:
5 i) a hollow preform of glass reinforcing
6 fibers approximately one inch long intimately intermixed
7 with separate thermoplastic fibers approximately two
8 inches long, wherein the ratio of glass fibers to resin
9 fibers is approximately 3:2 uniformly throughout said

10 preform, said preform having a cylindrical sidewall
11 portion, a domed bottom portion, and a domed top
12 portion, and
13 ii) a rigid mold having a cylindrical sidewall
14 portion and domed end portions corresponding to said
15 preform portions;
16 b) positioning said preform against the inner
17 surface of said corresponding mold portions;
18 c) compressing said preform with an internally
19 pressurized, flexible inflatable core inserted within
20 said preform and having a cylindrical sidewall portion,
21 and top and bottom dome portions to hold said preform
22 in place;
23 d) heating said preform to approximately 400
24 degrees F while maintaining that temperature for
25 between 20 and 60 minutes, while also increasing the
26 pressure in said inflatable core to approximately 25-30
27 psi to compress said preform and distribute ~~maintain the~~
28 ~~distribution of~~ the thermoplastic material throughout
29 said preform to provide a substantially void free fiber
30 reinforced molded article;
31 e) cooling said molded article until said
32 thermoplastic material is substantially solid;
33 f) reducing the pressure in said inflatable core;

34 g) removing said molded article from said
35 mold; and
36 h) removing said inflatable core from the
37 molded article.

1 **Claim 32 (previously presented):** The method of
2 claim 31 further comprising the step of connecting said
3 mold to a source of vacuum during said heating to further
4 reduce the incidence of voids in the finished article.

Claims 33-34 (canceled)

1 **Claim 35 (currently amended):** A method of making
2 hollow, reinforced plastic composite articles, comprising
3 the steps of:
4 a) providing, without a prior winding step:
5 i) a hollow preform comprised of a plurality
6 of discrete reinforcing fibers intimately intermixed with
7 a thermoplastic material, said preform having a
8 cylindrical sidewall portion, a domed bottom portion, and
9 a domed top portion, and
10 ii) a rigid mold having a cylindrical sidewall
11 portion and domed end portions corresponding to said
12 preform portions;

13 b) positioning said preform against the inner
14 surface of said corresponding mold portions; ~~without a~~
15 ~~prior winding step;~~
16 c) compressing said preform with an internally
17 pressurized, inflatable core inserted within said preform
18 ~~having a cylindrical sidewall portion, and top and bottom~~
19 ~~domed portions~~ to hold said preform in place;
20 d) heating said preform to a temperature
21 sufficient to melt said thermoplastic material while the
22 pressure in said inflatable core compresses said preform
23 and ~~distributes maintains the distribution of the~~
24 thermoplastic material throughout said preform to provide
25 a fiber reinforced molded article;
26 e) cooling said molded article until said
27 thermoplastic material is substantially solid;
28 f) reducing the pressure in said inflatable
29 core; and
30 g) removing said molded article from said mold.

1 **Claim 36 (currently amended):** A method of making
2 hollow, reinforced plastic composite articles, comprising
3 the steps of:
4 a) providing:

- 5 i) an assembled preform including a
6 cylindrical sidewall portion, a domed bottom portion, and
7 a discrete domed top portion;
- 8 ii) a rigid mold having a cylindrical sidewall
9 portion and domed end portions corresponding to said
10 preform portions; and
- 11 iii) a flexible, inflatable core;
- 12 b) positioning said core within said preform and
13 placing said cylindrical sidewall portion, said domed
14 bottom portion, and said discrete domed top portion
15 against the inner surface of said corresponding mold
16 portions to form an assembled preform having said core
17 inserted into an interior of said assembled preform;
- 18 c) inflating said core for compressing and
19 pressurizing said assembled preform to hold said
20 assembled preform in place;
- 21 d) heating and pressurizing said assembled preform
22 for a period of time to compress said assembled preform
23 and distribute maintain the distribution of the
24 thermoplastic material throughout said assembled preform
25 to provide a substantially void free fiber reinforced
26 molded article;
- 27 e) cooling said molded article until said
28 thermoplastic material is substantially solid;

29 f) reducing the pressure in said inflatable core;
30 g) removing said molded article from said
31 mold; and
32 h) removing said inflatable core from the molded
33 article.

1 **Claim 37 (currently amended):** The method of
2 claim 36, wherein at least one of said cylindrical
3 sidewall portion, said domed bottom portion, and said
4 discrete domed top portion are comprised of a plurality
5 of discrete reinforcing fibers intimately intermixed with
6 a plurality of discrete thermoplastic fibers.

1 **Claim 38 (currently amended)** A method of making a
2 hollow, reinforced pressure vessel, comprising the
3 steps of:

4 cutting thermoplastic fibers to form a plurality of
5 discrete cut thermoplastic fibers;
6 forming a hollow preform comprised of a cylindrical
7 sidewall portion, a domed bottom portion, and a domed top
8 portion, said forming including the steps of:
9 providing a plurality of discrete reinforcing
10 fibers, and

11 forming at least one of said cylindrical sidewall
12 portions, domed bottom portion, and said domed top
13 portion by collecting said plurality of discrete
14 reinforcing fibers and said plurality of discrete
15 thermoplastic fibers onto a vacuum screen to form said
16 one or more portions, wherein said plurality of fibers
17 substantially maintain a shape of said portions;
18 providing a rigid mold having a cylindrical sidewall
19 portion and domed end portions ~~corresponding to said~~
20 ~~preform portions~~;
21 positioning said portions preform against the inner
22 surface of ~~said~~ corresponding mold portions to assemble a
23 preform; and
24 heating said assembled preform sufficient to melt
25 said thermoplastic fibers and distribute thermoplastic
26 material from the thermoplastic fibers throughout said
27 preform to provide a fiber reinforced molded article.

1 **Claim 39 (previously presented):** The method of
2 claim 38, further comprising the step of providing a
3 hollow liner within said preform prior to said
4 positioning step.

1 **Claim 40 (previously presented):** The method of
2 claim 39 further comprising, during said heating, the
3 step of pressurizing the liner with a gas or a fluid.

1 **Claim 41 (previously presented):** The method of
2 claim 39 wherein said liner is a thermoplastic liner.

1 **Claim 42 (previously presented):** The method of
2 claim 38 further comprising, during said heating, the
3 step of connecting said mold to a source of vacuum during
4 the pressurizing step to further reduce the incidence of
5 voids in the finished article.

1 **Claim 43 (canceled).**

1 **Claim 44 (new):** A method of making a hollow,
2 reinforced plastic composite article, said method
3 comprising the steps of:
4 providing a domed top portion comprising a matrix of
5 reinforcing fibers and a thermoplastic material, said
6 matrix including a plurality of randomly positioned
7 discrete short individual fibers;

8 assembling a preform including said domed top
9 portion and a reinforcing mat wrapped to form a
10 cylindrical sidewall portion of said preform;
11 providing a rigid mold adapted for receiving said
12 preform; and
13 positioning said preform in said mold with an
14 inflatable core inserted within said preform;
15 pressurizing said core by connecting said core,
16 inserted within said preform, to a source of
17 pressurized fluid;
18 heating said preform with said pressurized core,
19 within said mold, to compress said assembled preform and
20 thereby melt and distribute said thermoplastic material
21 throughout said preform to provide a substantially void
22 free fiber reinforced molded article;
23 reducing the pressure in said core; and
24 removing said molded article from said mold.

1 Claim 45 (new) The method of claim 44, further
2 comprising the step of removing said core from said
3 molded article prior to using said molded article.